Evidence of temporary airway epithelial repopulation and rare clonal formation by BM-derived cells following naphthalene injury in mice.

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Public Summary:

Scientific Abstract:
The goal of the study was to investigate participation of bone marrow (BM) cells in the process of airway epithelial restoration after naphthalene-induced injury. We transplanted sex-mismatched green fluorescent protein (GFP) -tagged BM-derived cultured plastic-adherent mesenchymal stem cells into 5Gy-irradiated C57BL/6 recipients. After 1 month of recovery, experimental animals were subjected to 250 mg/kg naphthalene IP. Animals were killed at 2-30 days after naphthalene. By immunofluorescence, immunohistochemistry, and by in situ hybridization for the Y-chromosome, we observed patches of donor-derived cells in the large and small conducting airways, mostly at 2-6 days after injury. GFP(+) cells in the epithelium of airways were positive for pancytokeratin and some other epithelial markers. Although rare, GFP(+) cells formed clear isolated patches of the bronchial epithelium, consistent with clonal formation; as some cells were also positive for proliferating cell nuclear antigen, a marker of proliferating cells. After day 12, only occasional GFP(+) cells were present in the epithelium. These data confirm that bone marrow-derived cultured mesenchymal cells can participate in the recovery of the injured airway epithelium after naphthalene-induced injury with minimal long-term engraftment.